IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	
Donald J. Fasen	:	Group Art Unit 2627
Serial No. 10/700,065	:	Examiner: Goma, Tawfik A.
Filed: 11/03/2003	:	Date: December 21, 2006
For: MEMORY	:	

AFFIDAVIT UNDER 37 C.F.R. 1.131

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I hereby declare that I am the inventor of the invention entitled, MEMORY disclosed and claimed in the above-identified patent application.

Enclosed herewith is a copy of an invention disclosure, which shows that the invention was conceived by me before July 20, 2001. I continued to work diligently on the invention from the date of conception to my filing of a Patent Application on November 3, 2003. My conception and work on the invention occurred in the United States of America.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Inventor: Donald J. Fasen

Address: 12129 W. Musket, Boise, ID 83713

Citizenship: US

Donald J. Fasen 12/21/2006

Donald J. Fasen Date

Write in Dark Ink on Front Side Only, Please

INVENTION DISCLOSURE

PAGE ONE OF ____

PDNO 10016512 DATE RCVD 5.11.01 ATTORNEY AJB

Instructions: *The information contained in this document is* ***COMPANY CONFIDENTIAL*** *and may not be disclosed to others without prior authorization. Submit this disclosure to the HP Legal Department as soon as possible. No patent protection is possible until a patent application is authorized, prepared, and submitted to the Government.*

Descriptive Title of Invention: Pattern Servo Code in MEMs Device

Name of Project: Orca

Product Name or Number:

Was a description of the invention published, or are you planning to publish? If so, the date(s) and publication(s):

No

Was a product including the invention announced, offered for sale, sold, or is such activity proposed? If so, the date(s) and location(s):

No

Was the invention disclosed to anyone outside of HP, or will such disclosure occur? If so, the date(s) and name(s):

If any of the above situations will occur within 3 months, call your IP attorney or the Legal Department now at 1-898-4919 or 970-898-4919.

Was the invention described in a lab book or other record? If so, please identify (lab book #, etc.)

Was the invention built or tested? If so, the date:

No

Was this invention made under a government contract? If so, the agency and contract number:

No

Description of Invention: *Please preserve all records of the invention and attach additional pages for the following. Each additional page should be signed and dated by the inventor(s) and witness(es).*

A. Description of the construction and operation of the invention (include appropriate schematic, block, & timing diagrams; drawings; samples; graphs; flowcharts; computer listings; test results; etc.)
B. Advantages of the invention over what has been done before.
C. Problems solved by the invention.
D. Prior solutions and their disadvantages (if available, attach copies of product literature, technical articles, patents, etc.).

Signature of Inventor(s): Pursuant to my (our) employment agreement, I (we) submit this disclosure on this date: [ ].

Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
	Donald J Fasen	Donald J Fasen			PSB
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name

(If more than four inventors, include additional information on another copy of this form and attach to this document)

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INVENTION DISCLOSURE COMPANY CONFIDENTIAL PAGE ____ OF ____

Signature of Witness(es): *(Please try to obtain the signature of the person(s) to whom invention was first disclosed.)*

The invention was first explained to, and understood by, me (us) on this date: [ ]

Full Name	Signature	Date of Signature
Richard L Hilton	Richard L Hilton	5/10/01
Full Name	Signature	Date of Signature

Inventor & Home Address Information: *(If more than four inventors, include addl. information on a copy of this form & attach to this document)*

Inventor's Full Name: Donald J. Fasen

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Pattern Servo Code in MEMs Device

Updated: Thursday, 10-May-2001 12:24:01 MDT

5/9/01

Abstract

A high resolution position signal and timing generator is created using a patch of pre-written spots on the Orca media. The position signal is used to control the resonances in the mover and maintain the accurate and repeatable across track positioning needed for data integrity. The timing is needed for proper placement of the data bits down the track during writing of the data and for proper timing of the bit windows during data reads.

Background

In order to implement servo control for the Orca mover, a position sensor capable of indicating the relative position of the rotor with respect to the emitter wafer is required. To achieve the high data capacity of the Orca module, the center to center track spacing is only 40nm. This small track pitch requires precise positioning of the tracks relative to the emitters which access the data on these tracks.

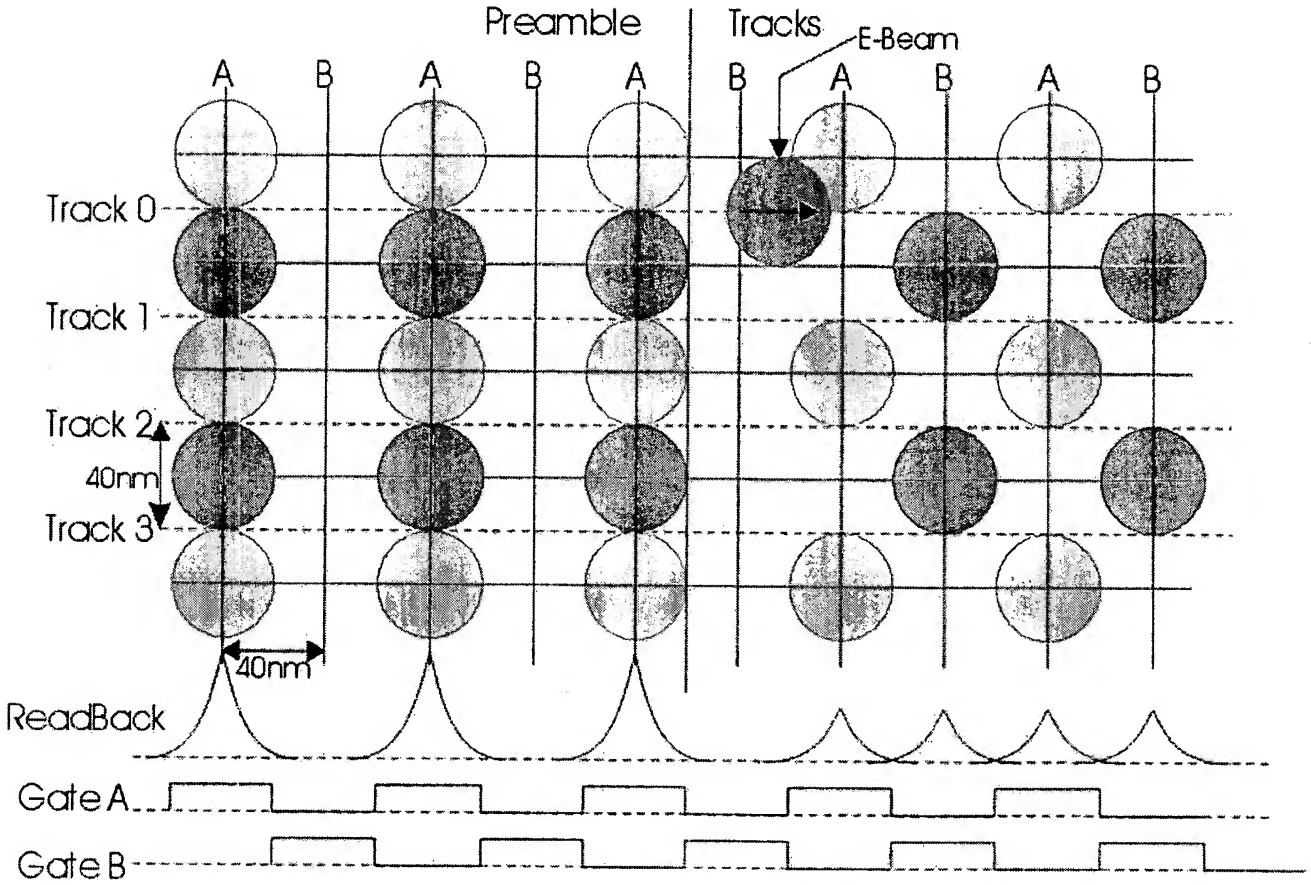
Typically, a misalignment of 10% of the track pitch will cause a severe degradation in the ability to recover the data on a track. This implies that the positioning system must maintain the track alignment to less than 4nm and that position sensors used to maintain position alignment must have a resolution of less than .4nm. This fine resolution is very difficult to achieve in a small, low cost device.

Reliable data recovery also requires accurate down the track timing information to properly window the data bits. This timing must be available before any data is written on the tracks so that the data can be written with uniformly spaced bits down the track.

Servo Pattern

The servo pattern approach presented can achieve these position resolution and timing generation requirements.

Servo Code Pattern



The pattern is written using the same type of media and emitters used to write data bits.

Since the across track pitch of the servo bits is the same as the track pitch, the full scale range of the position signal generated from the servo bits is one track. This allows for an across track resolution which scales with the track pitch and allows for a position signal with resolution which is a small subdivision of the track.

Similarly, the servo bits are pulse detected down the track to create a digital pulse stream which can be fed to a Phase Locked Loop for smoothing and defect tolerance. The clock generated by this PLL can be used for timing of the data write pulses and for framing data readback pulses.

The writing and reading of the servo pattern uses the same methods as are used in writing and reading the data bits. This allows for the same emitters and sense diodes to be used for servo pattern channel. Also, most of the signal processing electronics are identical to the read/write electronics allowing for minimal additional circuit design.

There is a pair of servo tracks for each of the 1000 data tracks in a data patch and the servo read beam will be centered between 2 adjacent servo tracks when the data beams are centered over the data tracks. The servo pattern is written in 4 patches on the media during the manufacturing process. This allows for

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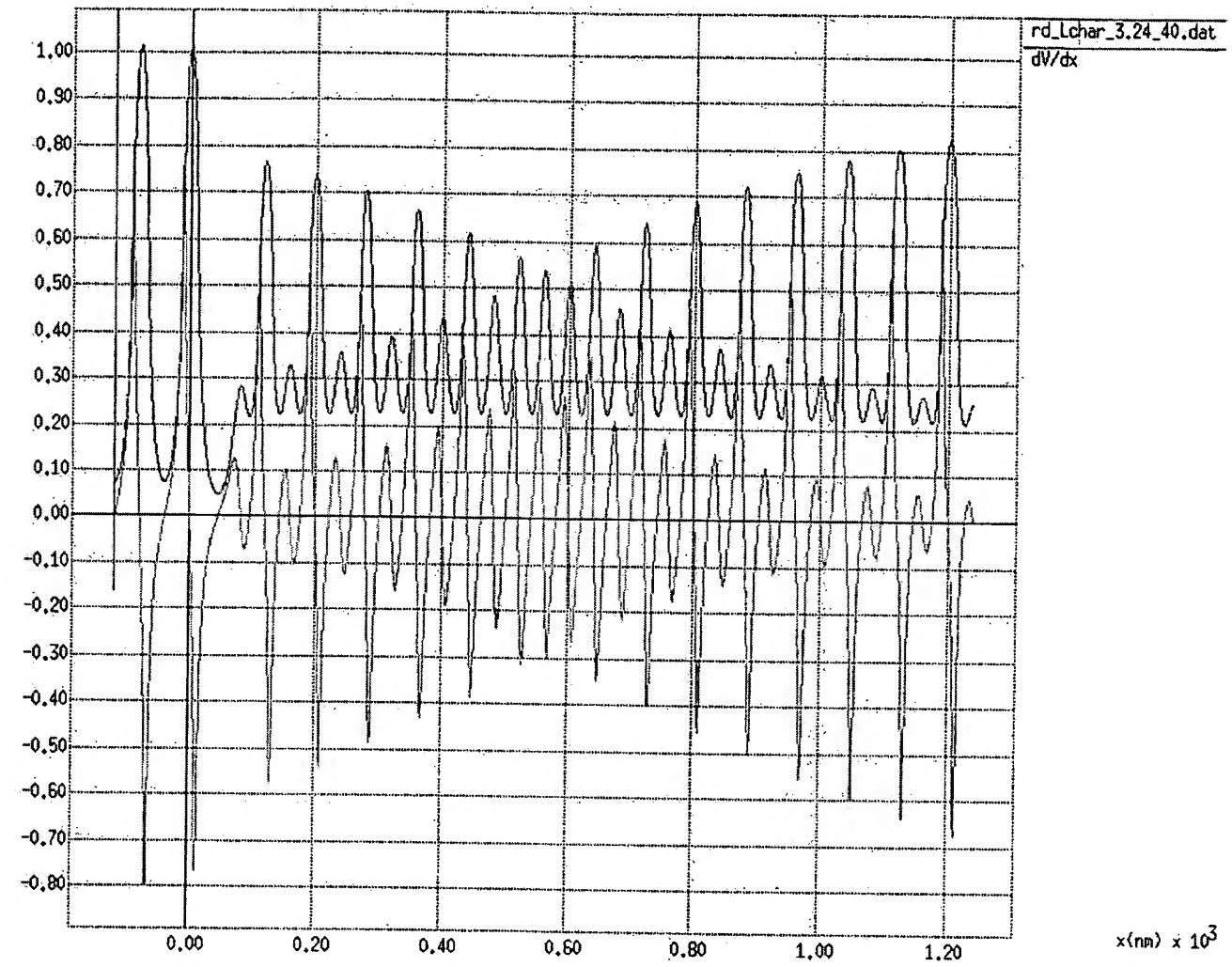
rb_L3.24_40_swp.dat



any 3 of the 4 servo emitters to be defective and still read the servo pattern. Grouping the servo patches in a center cluster allows the used of a single sense diode for the servo signal readback. This allows reduces the media overhead for the servo patches and allows the signals from any of the servo patches to be routed off of the mover with a single pair of traces.

Since the servo patches are never written in normal use, the write capability can be disabled at the end of the manufacturing process to ensure that the servo pattern is not overwritten.

Many other servo patterns are possible including patterns with track identification marks, special timing marks and burst A-B pulse patterns. The pattern shown here is being considered because of it's simplicity.

Model of readback of servo pattern

Below is a plot of a -4nm to +4nm sweep across the servo pattern tracks. The red trace is the raw readback signal while the green trace is the differentiated signal. Either or both of these signals may be used for position and timing generation.

The preamble ends after the pulse at x=0.

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